

NORYL IMPELLER CASE STUDY

NORYL IMPELLER

METAL-REPLACEMENT IMPELLER SOLUTION

Amid challenging global economic conditions and an increasingly competitive marketplace, manufacturers are constantly seeking ways to reduce product weight, lower production costs and improve performance.

That's why producers in industries as varied as electronics, aerospace, medical and automotive commonly turn to metalreplacement plastics for their components.

Manufacturing in plastic is an attractive option for several reasons. Plastic's lower density compared to metal provides a weight reduction while its pliability offers greater design freedom with the ability create complex, intricate shapes.

Meanwhile, plastic offers safety benefits and extensive product life courtesy of its flame, corrosion and impact-resistant properties while part consolidation – where the total number of parts is reduced by merging suitable components – delivers significant cost savings.

However, there are many factors to consider to ensure that plastics are able to achieve the same performance as metals including temperature resistance, flexural strength and durability.

That's never truer than in hygiene-critical applications where end-use parts and components are in contact with potable water and equipment producers around the world must ensure their systems comply with regional legislation such as the European Drinking Water Directive.

Tool making and injection moulding specialist WSM INDUSTRIES is firmly established as a leader in metalreplacement plastics, collaborating with some of the biggest names in the aerospace, automotive and medical industries. specialist WSM INDUSTRIES is firmly established as a leader in metalreplacement plastics, collaborating with some of the biggest names in the aerospace, automotive and medical industries.

WSM works alongside its partners throughout every project stage, including the design refinement and prototyping phases where mould tools and end products are rigorously tested to ensure compliance.

That was why Flowserve, a world leader in flow control systems, turned to WSM to develop a mould tool for the production of a metal-replacement plastic pump impeller that would be suitable for drinking water applications up to 85°C.

Flowserve was looking to reduce the weight of its products without compromising on performance, which would allow it to lower production and shipping costs and consequently offer greater value to its customers.

After being approached, WSM's technical team met with their Flowserve counterparts and began by assessing the part's intended use and required properties.

Following a thorough review, WSM recommended the thermoplastic resin NORYL[™] as the ideal replacement for cast metal.

The NORYL[™] family of resins offers combinations of advanced polyphenylene ether (PPE) technology which offers characteristics such as:

- High heat resistance
- Very low moisture uptake
- Long-term dimensional stability, even in high-temperature, water and humid conditions
- Very low specific gravity
- Good impact resistance, tensile strength and flexural strength

Tool making and injection moulding

The use of NORYL[™] makes the pump suitable for reverse osmosis plants and handling de-ionised and demineralised water where product contamination cannot be permitted.

Prototype mould tools were produced at WSM's state-of-the-art tool room and NORYL[™] impellers manufactured to trial in comparison with existing cast-metal models.

These trials highlighted a significant improvement in performance when using NORYL[™] impellers, which achieved total head as high as 400 metres compared to 250 metres for cast-metal models at 2,900 rpm.

Meanwhile, the NORYL[™] impeller proved itself capable of operating at a working pressure as high as 29.5 bar while handling liquids up to 100°C.

Thanks to WSM's comprehensive service offering, Flowserve was able to replace cast metal in its impeller production without compromising on component performance while the product comfortably achieved compliance with high-temperature drinking-water applications.

That's in addition to the part's reduced weight, which allowed Flowserve to lower the cost of manufacturing the component, equating to a significant saving.



COLMAKING WSM INDUSTRIES' global tool room facilities are equipped with cutting-edge machinery for bespoke mould tooling solutions.





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